

WHAT IS CLAIMED IS:

1. An electrophysiology device for use in a patient's body lumen, comprising:

5 a) an elongated shaft having a proximal end, a distal end, and a distal shaft section with a helical shape having one or more turns configured to conform to an inner diameter of the body lumen; and

b) at least one electrode on an exterior portion of the distal shaft section.

10 2. The device of claim 1 wherein the turns of the helically shaped distal shaft section have a diameter substantially equal to a diameter of the body lumen.

15 3. The device of claim 1 wherein the helically shaped distal shaft section has at least one and one quarter turns having substantially equal diameters.

4. The device of claim 1 wherein the shaft comprises a tubular member disposed about a core member.

5. The device of claim 4 wherein the core member has distal section having a helical shape.

6. The device of claim 4 wherein the core member comprises a NiTi alloy.

7. The device of claim 4 wherein the shaft has a lumen extending therein configured to slidably receive the core member.

5 8. The device of claim 1 including a plurality of sensing and pacing and ablation electrodes on the distal shaft section.

9. The device of claim 1 wherein the distal shaft section includes a proximal portion having the helical shape, and a distal portion extending from the proximal portion with a noncoiled shape.

10 10. The device of claim 9 wherein the distal portion has a substantially straight shape.

11. The device of claim 9 including a flexible coiled tip extending from the distal end of the proximal portion.

12. An electrophysiology device, comprising:

- 15 a) an elongated shaft having a proximal end, a distal end, and a distal shaft section having a proximal portion with a helical shape having one or more turns, and a noncoiled distal portion; and
- b) at least one electrode on an exterior portion of the distal shaft section.

13. The device of claim 12 wherein the distal portion has a substantially straight shape.

14. The device of claim 12 wherein the at least one electrode is on the helical proximal portion.

5 15. The device of claim 12 including at least one electrode on the distal portion.

16. The device of claim 12 having a plurality of ablation electrodes on the helical proximal portion, and at least two sensing and pacing electrodes on the distal portion.

10 17. The device of claim 16 including at least two sensing and pacing electrodes on a proximal section of the shaft located proximal to the helical proximal portion.

18. The device of claim 12 including a flexible coiled tip extending from a distal end of the distal portion.

15 19. The device of claim 12 wherein the distal portion has a length of about 2 to about 8 cm.

20. The device of claim 12 wherein the helical proximal portion has a length of about 0.5 to about 1 cm.

21. The device of claim 12 wherein the helical proximal portion has a circumference of about 5 to about 40 mm.

22. An electrophysiology device, comprising:

a) an elongated shaft having a proximal end, a distal end, and a distal shaft section having a proximal portion with a helical shape having at least one turn, and a distal portion extending in a substantially straight configuration distally from the helical proximal portion; and

b) at least one electrode on an exterior portion of the distal shaft section.

23. A method of performing a medical procedure, comprising:

a) providing an electrophysiology device, comprising an elongated shaft having a proximal end, a distal end, and a distal shaft section having a proximal portion with a helical shape having one or more turns and a distal portion with a noncoiled shape; and

at least one electrode on an exterior portion of the helical proximal portion; and

b) positioning at least a section of the helical proximal portion in contact with a wall defining an ostium of a patient's body lumen; and

c) delivering high frequency energy to the electrodes to form a lesion.

24. The method of claim 23 including after (b), moving the turns of the helical proximal portion closer together by distally forcing the catheter against the wall defining the ostium.

25. The method of claim 23 wherein the ostium is a junction of a pulmonary vein with a left atrium, and (c) comprises forming a plurality of discontinuous lesions around the ostium.

26. The method of claim 23 wherein the ostium is a junction of a pulmonary vein with a left atrium, and the device has at least one sensing and pacing electrode on the distal portion, and including mapping the pulmonary vein by sensing electrical activity with the sensing and pacing electrode.

27. A method of performing a medical procedure, comprising:

- a) providing an electrophysiology device, comprising
 - i) an elongated shaft having a proximal end, a distal end, and a distal shaft section with a helical shape having one or more turns configured to conform to an inner diameter of a body lumen of the patient; and

ii) at least one electrode on an exterior portion of the distal shaft section;

b) positioning the device within the body lumen, so that the electrodes contact a wall defining the body lumen; and

5 c) delivering high frequency energy to the electrodes on the device to form a lesion extending at least in part around the wall defining the body lumen.

28. The method of claim 27 wherein the medical procedure is treating a patient for atrial arrhythmia, and (b) comprises positioning the
10 device in a pulmonary vein.

29. The method of claim 28 wherein the device has a plurality of electrodes on the helical distal shaft section, and including forming a plurality of discontinuous lesions extending in a helical pattern along a length of the pulmonary vein.

15 30. The method of claim 28 wherein the device has a plurality of electrodes on the helical distal shaft section, and including forming a plurality of lesions connected together to form a continuous lesion extending in a helical pattern along a length of the pulmonary vein.

20 31. The method of claim 28 wherein the device has a plurality of electrodes on the helical distal shaft section, and including after (c), moving

the turns of the helical distal shaft section closer together and delivering high frequency energy to at least one electrode on the helical distal shaft section to form a second lesion continuous with the first lesion.

32. The method of claim 28 wherein the device distal shaft section includes a proximal portion with the helical shape having a plurality of ablation electrodes, and a distal portion extending from the proximal portion with a noncoiled shape having at least one sensing and pacing electrode, and including and including mapping the pulmonary vein by sensing electrical activity with the sensing electrode.